

Remarks

Claims 1-22 have been rewritten as claims 23-43 to define the invention more specifically. The claims now all contain features that perform voice recognition using grammar extraction on at least one utterance after narrowing down the list of potential users from a larger number to a smaller number using a different form of voice recognition. The different form of voice recognition can include grammar extraction on a different portion of the at least one utterance from the ultimate grammar extraction, or can include voice recognition not involving grammar extraction. This allows a higher recognition accuracy than would be possible from a single grammar extraction alone, while still employing grammar extraction as part of the recognition process to allow the use of "nonsense words": including words not found in a conventional dictionary.

Schier does not narrow a list of potential users down using voice recognition, and then perform grammar extraction to recognize the user. Schier performs a single voiceprint extraction to identify the user.

Webb ("Speaker identification experiments using HMMs") also does not narrow a list of users down using voice recogniton. Webb narrowed a list of users down by manual

selection (page II-388, column 2, lines 3-15), not using recognition techniques.

Because neither Schier nor Webb discloses narrowing down a set of users using recognition and then using the  
5 narrowed down set of users to perform speech recognition using grammar extraction, claims 23-43 are patentably distinguishable over Schier and Webb, either alone or in combination.

Version Showing Changes

Cancel claims 1-22 and add claims 23-43 as follows:

23. (new) A method of obtaining a user's identity by voice, comprising:

receiving a set of at least one known grammar and a set of at least one known voiceprint corresponding to a plurality of utterances from each of a first plurality of users;

for each of the first plurality of users, associating the set of at least one known grammar and the set of at least one known voiceprint with an identifier of said user;

10 receiving at least one utterance from a subject user;

performing a voice recognition on at least one of the at least one utterance received from the subject user, said voice recognition being different from extracting a grammar from a first at least one of the at least one utterance received from the subject user;

15 responsive to the voice recognition technique, selecting from the first plurality of users a second plurality of users, smaller than the first plurality of users by a factor of at least ten, for which the first

20 voice recognition most closely matches at least one selected from the set of at least one grammar and the set of at least one voiceprint associated with the identifiers of the second plurality of users;

from the second plurality of users, selecting the user

25 for which a grammar of the first at least one of the at least one utterance received from the subject user most closely matches at least one of the set of at least one grammar associated with the identifiers of the second plurality of users;

30 verifying a voiceprint of at least one of the at least one utterance has at least a similarity to the set of at least one voiceprint of the selected user; and

responsive to the verifying step, providing the

35 identifier of the selected user as the identifier of the subject user.

24. (new) The method of claim 23 wherein the voice recognition comprises extracting a grammar from a second at least one of the at least one utterance received from the subject user, the second at least one of the at least one utterance having at least one difference from the first at least one of the at least one utterance.

25. (new) The method of claim 23 wherein the voice recognition technique comprises speaker independent voice recognition.

26. (new) The method of claim 23 wherein the first at least one of the at least one utterance comprises a password.

27. (new) The method of claim 23 wherein a number of the second plurality of users corresponds to a constant.

28. (new) The method of claim 23 wherein the second plurality of users corresponds to users for which the voice recognition technique yields a confidence level exceeding a threshold.

29. (new) The method of claim 23 wherein at least one of the at least one utterance may be other than a real word.

30. (new) A system for obtaining a user's identity by voice, comprising:

storage for storing and providing at an output a set of at least one known grammar and a set of at least one known voiceprint corresponding to a plurality of utterances from each of a first plurality of users, for each of the first plurality of users, the set of at least one known

grammar and the set of at least one known voiceprint being associated with an identifier of said user;

10       a first recognizer having an input operatively coupled for receiving at least one utterance from a subject user, the first recognizer for performing a voice recognition on at least one of the at least one utterance received from the subject user, said voice recognition being different  
15       from extracting a grammar from a first at least one of the at least one utterance received from the subject user, the first recognizer additionally for, responsive to the voice recognition technique, selecting from the first plurality of users a second plurality of users, smaller than the  
20       first plurality of users by a factor of at least ten, for which the first voice recognition most closely matches at least one selected from the set of at least one grammar and the set of at least one voiceprint associated with the identifiers of the second plurality of users received at a  
25       second input coupled to the storage output, and for providing at an output identifiers of the second plurality of users;

          a second recognizer having a first input for receiving the identifiers of the second plurality of users, and a  
30       second input for receiving at least one of the at least one

utterance from the subject user, the second recognizer for extracting a grammar from the at least one of the at least one utterance received at the second second voice recognizer input, and for selecting from the second

35 plurality of users the user for which the grammar extracted most closely matches at least one of the set of at least one grammar associated with the identifiers of the second plurality of users received at a third input coupled to the storage output, and for providing an identifier of the

40 selected user at an output;

a verifier having a first input coupled to the second recognizer output, the verifier for obtaining a voiceprint of at least one of the at least one utterance received at a second input, and for verifying a voiceprint of at least one of the at least one utterance has at least a similarity to the set of at least one voiceprint of the selected user received at a third input coupled to the storage output; and responsive to said verification, providing at an output the identifier of the selected user as the identifier of

45

50 the subject user.

31. (new) The system of claim 30 wherein the first recognizer performs the voice recognition by extracting a grammar from a second at least one of the at least one

utterance received from the subject user, the second at  
5 least one of the at least one utterance having at least one  
difference from the first at least one of the at least one  
utterance.

32. (new) The system of claim 30 wherein the first  
recognizer performs the voice recognition using speaker  
independent voice recognition.

33. (new) The system of claim 30 wherein the first at  
least one of the at least one utterance comprises a  
password.

34. (new) The system of claim 30 wherein a number of  
the second plurality of users corresponds to a constant.

35. (new) The system of claim 30 wherein the second  
plurality of users corresponds to users for which the voice  
recognition performed by the first recognizer yields a  
confidence level exceeding a threshold.

36. (new) The system of claim 30 wherein at least one  
of the at least one utterance may be other than a real  
word.

37. (new) A computer program product comprising a  
computer useable medium having computer readable program  
code embodied therein for obtaining a user's identity by  
voice, the computer program product comprising computer

5 readable program code devices configured to cause a computer to:

receive a set of at least one known grammar and a set of at least one known voiceprint corresponding to a plurality of utterances from each of a first plurality of  
10 users;

for each of the first plurality of users, associate the set of at least one known grammar and the set of at least one known voiceprint with an identifier of said user;

receive at least one utterance from a subject user;

15 perform a voice recognition on at least one of the at least one utterance received from the subject user, said voice recognition being different from extracting a grammar from a first at least one of the at least one utterance received from the subject user;

20 responsive to the voice recognition technique, select from the first plurality of users a second plurality of users, smaller than the first plurality of users by a factor of at least ten, for which the first voice recognition most closely matches at least one selected from  
25 the set of at least one grammar and the set of at least one voiceprint associated with the identifiers of the second plurality of users;

from the second plurality of users, select the user  
for which a grammar of the first at least one of the at  
30 least one utterance received from the subject user most  
closely matches at least one of the set of at least one  
grammar associated with the identifiers of the second  
plurality of users;

verify a voiceprint of at least one of the at least  
35 one utterance has at least a similarity to the set of at  
least one voiceprint of the selected user; and  
responsive to the computer readable program code  
devices configured to cause the computer to verify, provide  
the identifier of the selected user as the identifier of  
40 the subject user.

38. (new) The computer program product of claim 37  
wherein the computer readable program code devices  
configured to cause the computer to perform voice  
recognition comprise computer readable program code devices  
5 configured to cause the computer to extract a grammar from  
a second at least one of the at least one utterance  
received from the subject user, the second at least one of  
the at least one utterance having at least one difference  
from the first at least one of the at least one utterance.

39. (new) The computer program product of claim 37  
wherein the computer readable program code devices  
configured to cause the computer to perform voice  
recognition comprise computer readable program code devices  
5 configured to cause the computer to perform speaker  
independent voice recognition.

40. (new) The computer program product of claim 37  
wherein the first at least one of the at least one  
utterance comprises a password.

41. (new) The computer program product of claim 37  
wherein a number of the second plurality of users  
corresponds to a constant.

42. (new) The computer program product of claim 37  
wherein the second plurality of users corresponds to users  
for which the voice recognition technique yields a  
confidence level exceeding a threshold.

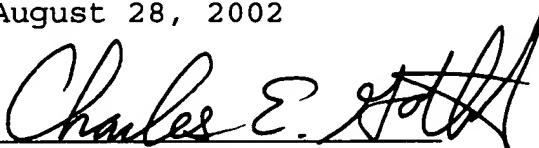
5 43. (new) The computer program product of claim 37  
wherein at least one of the at least one utterance may be  
other than a real word.

Thus, claims 23-43 are patentably distinguishable over  
the cited references. Favorable action is solicited.

Respectfully submitted,  
August 28, 2002

5

10

By:   
Charles E. Gotlieb  
Registration No. 38,164  
Innovation Partners  
540 University Ave., Suite 300  
Palo Alto, CA 94301  
(650) 328-0100